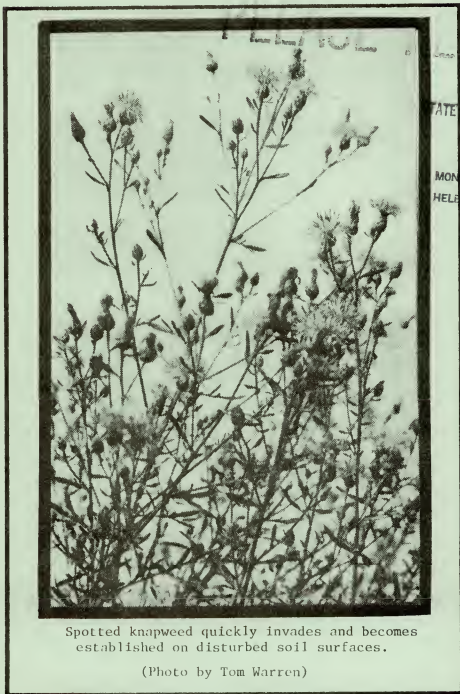


S  
632.954  
F2n  
1988

# NOXIOUS WEED MANAGEMENT

## 1987 AND 1988 ANNUAL REPORTS



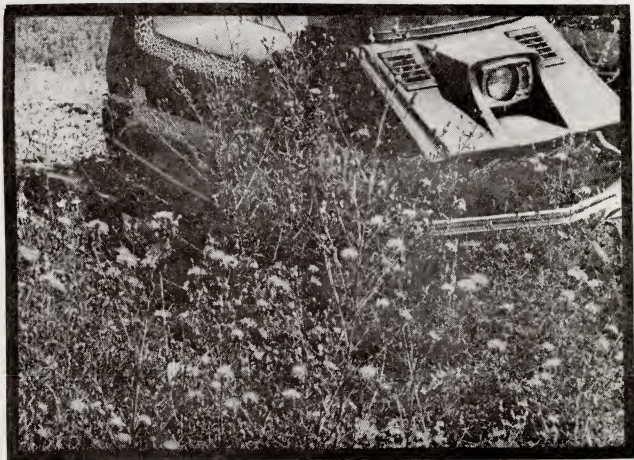
*Montana Department of  
Fish, Wildlife & Parks*

## DEPARTMENT GOAL

To benefit the people by conserving fish, wildlife, and the natural environment and to provide quality outdoor recreational opportunities that:

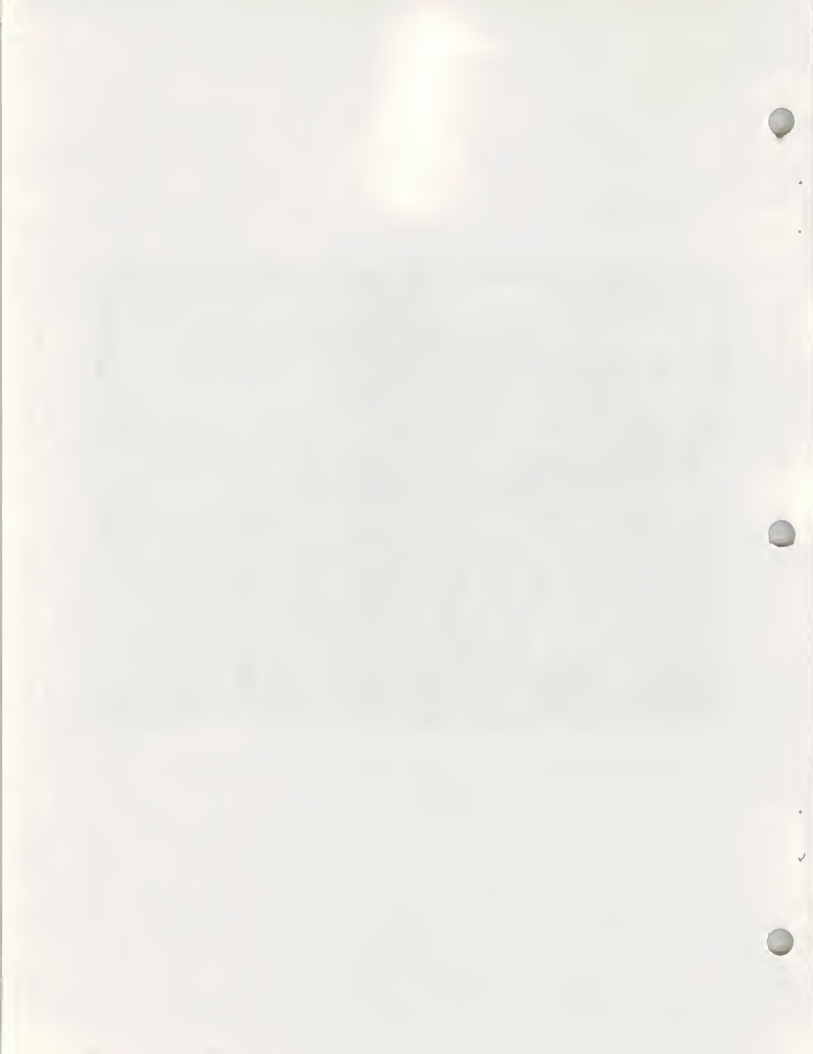
- 1) Are consistent with the capabilities and requirements of the resources.
- 2) Recognize present and future human needs and desires.
- 3) Ensure maintenance or enhancement of the environment.

Frontispiece



Spotted knapweed seeds can be inadvertently spread on  
oversnow vehicles stored on disturbed sites during non-use  
seasons.

(Photo by Tom Warren)



NOXIOUS WEED MANAGEMENT

1987 and 1988 Annual Reports

John P. Weigand  
Weed Projects Coordinator

July 1989

MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS  
Helena, Montana



## EXECUTIVE SUMMARY

Mandates and goals of the Montana Department of Fish, Wildlife and Parks (MDFWP) are unique among those of other state agencies and public and private land managers in the state. They are directed toward the protection and perpetuation of some of Montana's most natural and cultural resources. And they are oriented toward public enjoyment of those resources.

Therefore, the MDFWP has initiated a multi-faceted approach in addressing noxious weed management, both on the properties it manages directly for sportsmen and the general public, and as an advisor to others in wildlife-noxious weed issues:

- . Control of noxious weeds on MDFWP lands, via chemical, mechanical and biological control.
- . Education of the public through demonstration areas, visual-audio materials, presentations to organizations, attendance at weed meetings, and annual reports.
- . Research into various wildlife-noxious weed relationships

Minimums of \$77,710 and \$72,530 were spent in FY1987 and FY1988, respectively, by the MDFWP in these approaches. These amounts include some employee wages and benefits, operations and equipment. They do not reflect most of the time spent by wildlife biologists and area managers in weed control in Wildlife Management Areas, nor time spent by administrators on this issue. The principal source of money for this work continues to be sportsmen fishing, hunting and trapping licenses and federal cost-sharing via excise taxes on sport fishing and hunting equipment.

Managing noxious weeds extended throughout the state, and included all 7 administrative regions. The following summarizes field activities and costs by division:

<u>FY1987</u>				<u>FY1988</u>			
<u>Division</u>	<u>No. Sites</u>	<u>No. Acres</u>	<u>Cost</u>	<u>No. Sites</u>	<u>No. Acres</u>	<u>Cost</u>	
Parks	99	364+	\$69,562	186	1,049	\$51,905	
Wildlife	25	1,391	2,532	15	1,045	\$17,105	

Noxious weeds are also controlled at fish hatcheries and spawning stations, but expenditures are part of routine area maintenance costs.

Coordination of the department's noxious weeds projects cost \$5,616 in FY1987 and \$3,610 during FY1988.

The department should plan for expenditures of up to \$100,000 annually in directly accountable noxious weed management





activities. The exact amount will continue to vary with weather and other environmental conditions that produce those species, amount of recreational use on department properties, amount of new property acquisitions, and competition for personnel time by other activities.



## CONTENTS

EXECUTIVE SUMMARY	iii
INTRODUCTION	1
PROJECT OBJECTIVES AND HISTORIES	1
PROCEDURES	2
Ongoing Department Weed Management	
Coordinated Weed Control	
SOURCES OF FUNDING	2
RESULTS	
Ongoing Department Weed Management	3
Control	3
Education	11
Research	13
Coordinated Weed Control	14
Control	14
Wildlife Management Areas	15
Coordination	17
Conservation Reserve Program	18
DISCUSSION	19
RECOMMENDATIONS	22
LITERATURE CITED	24
APPENDIX	26



## INTRODUCTION

Noxious weeds have been identified as a serious economic problem in Montana. While 34 species of plants have been designated as noxious weeds, knapweeds (spotted-Centaurea maculosa, diffuse-C. diffusa), Russian-C. repens) and leafy spurge (Euphorbia esula) are considered currently most in need of control. In 1986, spotted knapweed occurred on an estimated 4.7 million acres in Montana, leafy spurge was on 600,000 acres, Russian knapweed on 47,000 acres, and diffuse knapweed on 16,000 acres (C.Lacey, pers. comm., Jan. 1988).

The Montana Department of Fish, Wildlife and Parks (MDFWP) manages 470 sites totaling 339,447 acres, less than 0.4% of the state's total land area. Most of these lands are managed for Montana recreationists as:

- . Fishing Access Sites (FAS)--to provide access to desirable fishing across the state
- . Parks (SP), Monuments (SM), and Recreation Areas (SRA)--to preserve historical and cultural settings.
- . Wildlife Management Areas (WMA)--to maintain wildlife and its habitats and to provide wildlife-oriented recreation.

The MDFWP has practiced some form of noxious weed control since its first property acquisition, the Red Rock Lake WMA, in 1916. Because of the routine nature of those efforts, noxious weed control activities remained in low profile. The department adopted a formal noxious weed policy in 1983 (Appendix A). Department funding was insufficient to achieve the level of plant control desired; the 1985 Legislature authorized expenditures of an additional \$20,000 per year during the 1986-1987 biennium for weed control activities by the Wildlife Division. An additional \$20,419 was available during 1987, \$26,254 in FY1988, and \$30,419 in FY1989.

The purpose of this report is to summarize total MDFWP activities and expenditures, including those as part of the additional appropriations. The source of funds for this effort is hunting and license fees, and federal monies; no General Fund appropriations have been authorized.

This report covers the period January 1, 1987 through December 1988.

## PROJECT OBJECTIVES AND HISTORIES

This report is intended to present results from 2 related efforts; their objectives, and their histories are as follows:

1. TITLE: Ongoing Department Weed Management  
  
OBJECTIVE: To disseminate information and track progress towards implementing Montana's new weed laws.  
  
HISTORY: Changes in Montana weed laws passed by the 1985 Legislature will require an increased effort in department weed management and control activities. This will involve disseminating information on new laws and setting up a standardized questionnaire to retrieve tracking information.
2. TITLE: Coordinated Weed Control  
  
OBJECTIVE: To coordinate with county weed boards on implementation of the new weed laws.  
  
HISTORY: Because of new weed legislation passed in 1985, there is an increased need to coordinate weed management activities with county weed boards and adjacent landowners. Additional requests have been received to form action committees and initiate cooperative projects. This will entail increased meetings, mapping of weed occurrence and intensified management on our lands by chemical, mechanical and biological control methods.

This project will be administered through the Wildlife Division.

#### PROCEDURES

##### Ongoing Department Weed Management

All department noxious weed management plans will be reviewed and modified as necessary. Weed control will be accomplished as specified in the plans and the degree of control evaluated.

##### Coordinated Weed Control

At least one regular meeting of each county weed board will be attended by a designated department employee during the year. Our representative will provide an explanation of current weed management on our lands in appropriate counties. In all counties, our representative will have to develop county-wide noxious weed management plans that will prevent damage to wildlife and fish habitats. They shall report results and proposed activities of the board to their regional supervisor, who will summarize each report for consideration by the department's weed coordinator. Reports may include recommendations for weed-wildlife/fish evaluations.

## SOURCES OF FUNDING

Current level funds will be utilized for the ongoing Weed Management Project, with possible redirection by some divisions. These will be integrated with the Executive Planning Process (EPP) coordinated Weed Control project as appropriate.

The 50th Montana Legislature developed, and Governor Ted Schwinden signed into law, HB 526 in early 1987. It is a law that provides for leasing or purchasing of land or easements for wildlife habitat. In Section 1 it provides that prior to acquisition of any land that a comprehensive analysis of a land program to control weeds and maintain roads and fences. Under Section 2 (4) "Twenty percent of the money allocated by this section must be credited to the account...for the development and maintenance of real property used for wildlife habitat." Various groups testifying at hearings on this bill expressed concern for noxious weed control, so that latter section is designed to include financing those activities on newly acquired lands. funds from the legislation address funding of development and maintenance of newly acquired property (by HB 526 funds), and not to existing MDFWP lands.

## RESULTS

### Ongoing Department Weed Management

The MDFWP's noxious weed management project involves 3 approaches:

- Control of noxious weeds on department properties
- Education of the public about our program and about the noxious weed issue generally
- Research on wildlife-noxious weed relationships

### Control

Field control of noxious weeds has been outlined in management plans for individual sites or groups of sites. Control methods include biological, chemical and mechanical; incendiary control is practiced only on an experimental basis for general big game winter range improvement. The type of control is prescribed on a site-by-site basis, i.e. integrated pest management. Evaluation of the effectiveness of control procedures has begun on some sites.

### 1987

In FY1987 the Parks Division spent \$69,562 on noxious weed management (Table 1). Treatment of fishing access sites, (\$16,039) and renovation of the underground sprinkler system on the capitol grounds (\$37,956) were the largest expenditures. Personal wages

and benefits (16,988) 24% of the total, operations (\$14,096)) were 20%, and equipment (\$38,480) comprised the remainder. Of the operations expenses, \$3,814 was for herbicides while \$3,480 involved contracting county weed districts for control.

Table 1. Summary of Expenditures for Weed Management  
by the Parks Division, by Region and Type of Site,  
During FY1987

Region	Type of Site				Total Expenditures
	FAS <sup>1</sup>	SM	SP	SRA	
1	\$ 944		\$ 365	\$2,981	\$ 4,290
2	6,294	1,284	56	2,527	10,161 <sup>2</sup>
3	4,577	60	2,323	24	6,984
4	798	282	246	1,134	2,460
5	1,455				1,503
6	1,971	1,060	212	377	3,620
7				2,588	40,544 <sup>3</sup>
Totals	\$16,039	\$2,686	\$3,202	\$9,631	\$69,562

<sup>1</sup> FAS = Fishing Access Sites, SM = State Monuments, SP = State Parks, SPA = SRA = State Recreation Areas.

<sup>2</sup> Includes \$564 for equipment.

<sup>3</sup> \$37,956 of total in equipment for renovation of underground sprinkler system on State Capitol Grounds. Remainder involves administrative sites.

Incomplete records indicated that at least 99 sites were treated for noxious weeds (Table 2). Most of the non-Helena treatments on those 364+ acres were mechanical. Spotted knapweed was of most concern.

A minimum of 1,391 acres on 25 WMAs received treatments for noxious weed control in 1987 (Table 3). The largest single area was 300 acres of knapweed on the Blackfoot-Clearwater WMA, albeit



biological treatments using knapweed gallflies and goatweed beetles may range significant distances from release sites. Knapweeds (spotted and diffuse) are the primary species of concern in the western half of the state, while leafy spurge is most troublesome in the east, and Russian knapweed occurs along the Highline. Canada thistle tends to be ubiquitous, and is usually treated where it occurs with other noxious species, or where it is in heavy densities by itself.

Table 2. Summary of Noxious Weed Treatments in Fishing Access Sites, State Parks, Monuments, and Recreation Areas during 1987.

Region	No. Sites	Type of Control	Noxious Weed Species Treated (No. Sites)	No. Acres (Est.)
2	37	Chemical (2) Mechanical (35)	Knapweed (37)	Range: 0.1-60 Total = 244.9
3	5	Chemical (2) Mechanical (3)	Knapweed (2) Whitetop (3) Leafy spurge (1) Canada Thistle (1)	Range: 3-35 Total = 60
4	24	Chemical (all)	Spotted knapweed (19) Leafy spurge (2) Dalmation Toadflax (2) Canada thistle (1)	Range: 1-5 Total = 50
6	1	Chemical	Leafy spurge Canada thistle	Total = 2
8	32 <sup>1</sup>	Chemical	Various/all	Range: spot-9

<sup>1</sup> State Capitol Complex and Agency Buildings.

Fish hatcheries and salmon spawning stations throughout the state also control a variety of noxious weeds. Areas are small and control activities are generally absorbed by regular project budgets. Because less than 20 acres were treated at a cost of less than \$800 in 1986, specific accounting was discontinued for 1987.

Table 3. Summary of noxious weed treatments and costs on Wildlife Management Areas during FY1987.

Region	No. Sites	Type of Control	Noxious Weed Species Treated (no. sites)	No. Acres
1	1	Chemical <sup>1</sup> Mechanical Biological	Diffuse knapweed, Dalmation Toadflax Whitetop, Canada Thistle	Total = .152 Range: 12-150
2	2 <sup>1</sup>	2 Chemical 1 Mechanical	Spotted knapweed (2) Thistle (1)	Total = 760 Range: Spot-300
3	1	Chemical	Knapweed (13)	Total= 32.25 Range: 0.75-6.25
4	5 <sup>2,3</sup>	Chemical (5) Mechanical (2)	Spotted Knapweed (5) Leafy Spurge (1) Canada Thistle (2) Field Bindweed (1) Whitetop (1)	Total = 263.5 Range: 0.5 -100
5	1	Chemical	Knapweed	5
6	3	Chemical	Leafy Spurge (2) Russian Knapweed (1) Canada Thistle (1)	Total = 78 Range: <1.0 - 76

<sup>1</sup> 5 locations on Blackfoot-Clearwater WMA and 19 on the Warm Springs WMA were treated.

<sup>2</sup> 5 locations on Freezout, 5 on the Beartooth, and 1 each on the Sun River, Ear Mountain, and Judith River WMAs were treated.

<sup>3</sup> Treatments vary according to species, season and location.

#### 1988

The Parks Division spent a total of \$51,905 in weed control efforts on fishing access sites and other natural and cultural areas during FY1988 (Table 4). Expenditures by categories are: Personal Services, \$20,520 (40%); operations, \$27,858 (54%) and equipment \$3,528 (7%). Examination of subcategories indicated \$16,693 of the operational costs involved contracting county weed districts to perform control measures (minimum, \$9,777) and purchasing herbicides (most of the remainder).

Table 4. Summary of Expenditures for Weed Management  
by the Parks Division, by Region and Type of site,  
During FY1988.

Region	Type of Site				Total Expenditures
	FAS <sup>1</sup>	N/CA	SP	SRA	
1	\$ 2,171		\$ 695	\$ 4,544	\$ 7,410
2	6,257	\$ 1,796	825	4,556	13,434
3	2,200	2,422	867	755	6,244
4	2,101		1,053	2,961	6,115
5	2,073		360	1,404	3,837
6	130				130
7	1,396	2,889	388	305	4,978
8					9,757 <sup>2</sup>
Totals	\$16,328	\$7,107	\$4,188	\$14,525	\$51,905

<sup>1</sup> FAS - Fishing Access Sites, N/CA = Natural and Cultural Areas, SP = State Parks, SRA = State Recreation Sites.

<sup>2</sup> Department warehouse and State Capitol Grounds.

Noxious weed treatments on WMAs are summarized in Table 5. Fifteen sites or WMAs contained at least one location with noxious plants, and a minimum of 1,045 acres were treated.

A mixture of treatments were used on 186 fishing access sites, state parks, monuments, and similar smaller public recreation areas (Table 5). Individual treatment sites ranged in size from "spots" up to an estimated 120 acres. Although a minimum of 1,049 acres was treated, most treated sites were less than 5 acres in size.

Knapweeds (species not necessarily distinguished) were the most common noxious species treated in the western 2/3 of the state (Regions 1-5), while leafy spurge and Canada or other thistles predominated east of the Continental Divide. The furthest east that spotted knapweed was identified was Treasure County. Several species were treated concurrently on numerous sites, mostly during chemical applications or mowing.

Ninety-five sites were treated chemically, 97 were treated mechanically (mostly mowing, but also some pulling in Region 3), and 6 received biological treatments. Biological treatments consisted of releasing insects for knapweed and leafy spurge control at 4 sites, while sheep grazed leafy spurge on another and goats grazed spurge on the remaining site. Some sites received multiple treatments, either several herbicide applications or mowings, during the growing season.

The Parks Division also has responsibility for maintaining the grounds of the Capitol Complex as well as several other state properties in Helena. Noxious weeds were treated chemically at the following facilities: Capitol Square, Labor and Industry, Old Board of Health, Department of Natural Resources and Conservation, Cogswell Building, Mitchell Building, Department of Justice, Governor's Mansion, liquor warehouse, Capitol bark beds, Department of Social and Rehabilitation Services, E.S.D. Building, State Motor Pool, Department of Commerce, Department of Institutions, Old Governor's Mansion, Office of Public Instruction, Boiler Plant, and the Department of Fish, Wildlife and Parks and its warehouse-publications complex.

Table 5. Summary of Noxious Weed Treatments On  
Fishing Access Sites, State Parks,  
Monuments, and Recreation Areas during FY1987

Region	No. Sites	Type of Control	Noxious Weed Species Treated (No. Sites) <sup>1</sup>	Acres
1	18	1 Chemical 17 Mechanical	Knapweed (17) Leafy Spurge (1)	Total = 28.6 Range: 0.5-10
2	54 <sup>2</sup>	16 Chemical 37 Mechanical 1 Reclamation	Knapweed (53)	Total = 262.5 Range: 0.1-120
3	56 <sup>3</sup>	33 Chemical 19 Mechanical 4 Biological	Knapweed (28) Leafy Spurge (7) Thistle (8) Toadflax (3)	Min. = 170 Range: Spot-20
4	21 <sup>4</sup>	Chemical	Spotted Knapweed (18) Leafy Spurge (3)	Total = 55 Range 1-6
5	23	16 Chemical 18 Mechanical 2 Biological	Knapweed (19) Spurge (17) Thistle (17) Hemlock (5) Bindweed (1)	Total = 417 Range: 2-40
6	1	Chemical	Leafy Spurge	Total = 0.5
7	14 <sup>5</sup>	8 Chemical 6 Mechanical	Spotted Knapweed (1) Leafy Spurge (5) Canada Thistle (8) Field Bindweed (5)	Minimum = 16 Range: Spot-40

<sup>1</sup> >1 spp/site

<sup>2</sup> 14 sites were given two treatments, and one site received six treatments; a multiple treatments were mechanical. A soil sterilant was used on 13 sites, a 1 site was reclaimed from crested wheat grass.

<sup>3</sup> 3 sites treated by the County Weed Control District, 3 sites treated private applicators, and 1 site treated biologically by USDA-APHIS; size of are treated unavailable.

<sup>4</sup> 2 sites treated chemically four times each.

<sup>5</sup> Additional 5 sites inspected and no noxious weeds present.

Noxious weed treatments totaled at least 1,045 acres of rangeland and 5 acres of cropland on WMAs (Table 6).

Table 6. Summary of Noxious Weed Treatments on Wildlife Management Areas During FY1988

Region	No. Sites	Type of Control	Noxious Species Treated (No. Sites) <sup>2</sup>	No. Acres
2	2 <sup>1</sup>	Chemical	Spotted Knapweed (2) Leafy Spurge (1) Whitetop (1) Thistle (1)	Total= 261.5 Range: 1-30
3	5	Chemical	Knapweed (5) Thistle (1)	Total = 63 Range: 1.25-48
4	4 <sup>1</sup>	4 Chemical 2 Mechanical	Spotted Knapweed (6) Leafy Spurge (2) Canada Thistle (4) Whitetop (1)	Total = 550.2 Range: 0.1-160
5	1	Chemical	Knapweed	Total = 5
7	3 <sup>1</sup>	3 Chemical 1 Mechanical 1 Biological	Canada Thistle (2) Burdock (1)	Total = 165 Range: Spot-100 (plus 500 A. cropland)

<sup>1</sup> Several locations treated at each site.

<sup>2</sup> Multiple species treated at some sites.

Fish hatcheries and spawning stations reported total expenses of \$2,160 for noxious weed control in FY 1988 (Table 7). Most of that money purchased herbicides, and no personal wages or benefits were included.

## Education

Preventing establishment and expansion is viewed as the most reasonable approach to effectively controlling noxious weeds over the long term. The MDFWP's attempting to present this view at weed meetings throughout the state. Informal contacts between local department employees and individual landowners is also encouraged.

Requests for presentations by the department at public meetings seem to have subsided during the past 2 years. Conservation education officers continue to show the MDFWP's two weed videos when deemed appropriate.

Table 7. Summary of Expenditures for Weed Management at State Fish Hatcheries and Spawning Stations, 1988

Region	Name of Hatchery	<u>Expenses</u>	
		Operations	Herbicide
1	Arlee Spawning Station		\$ 173
	Flathead Lake Salmon Hatchery		28
	Jocko River Trout Hatchery		73
	Washoe Trout Hatchery		656
4	Big Springs Trout Hatchery		418
	Giant Springs Trout Hatchery		46
5	Bluewater Hatchery	22	249
	Yellowstone River Trout Hatchery	23	0
7	Miles City Fish Hatchery		517

## 1987

Concern increased about potential risks to health of MDFWP employees that mixing and use herbicides on department properties. That concern followed a presentation at the annual meeting of the Montana Weed Control Association in January, 1987. The publication<sup>1</sup> (plus a scientific editorial<sup>2</sup>), upon which the presentation was based was then reviewed. An inquiry about our concerns was sent to the Montana State Epidemiologist, (Appendix B), and a response was received (Appendix C). The FWP subsequently issued a precautionary advisory to all FWP personnel that handle these chemicals (Appendix D) at the beginning of the 1987 growing season.

1, 2 Superscripts are the Reference Cited number.

Robert Martinka (Resource Assessment Manager) represented the department at a "Symposium on Noxious Weed Biology and Management" at Eastern Montana College, Billings on April 3, 1987. The presentation (Appendix E), co-authored by the Noxious Weeds Project Coordinator, was part of a panel discussion on "Weed Management by Land Management Agencies".

#### 1988

In 1988 a brochure describing perceived threats to wildlife habitats, designed by the Liberty County Weed District, was approved for partial funding by a grant from the Noxious Weed Trust Fund (administered by the Montana Department of Agriculture). Purpose of the brochure was to elevate public recognition of problems posed by spotted knapweed. Statements pertaining to threats by this species to elk and elk habitats were speculative rather than documented, so rewording was recommended. Because wording was changed toward more accurate portrayal of the problem, the department agreed to assist in disseminating the brochures. (Appendix F).

Additionally in 1988, the project leader addressed the Citizens Advisory Council, Miles City District - Bureau of Land Management, concerning the MDFWP's role in Noxious Weed Management Program (Appendix G).

Popular articles released by the MDFWP via Montana Outdoors that addressed noxious weed management and legislation include:

- 1971        Montana's Weed Control Law: (ecological) Ignorance or Arrogance. John P. Weigand. Vol. 2, No. 3: pp 31-35.
- 1977        The Weed Control Follies. Noel Rosetta. Vol. 8, No. 1: pp. 2-8.
- 1978        A Weed is a Weed is a Weed...or is it? John P. Weigand. Vol. 9, No. 2: pp 9-13.
- 1978        The Biological control of Weeds. Jim Story. Vol. 9, No. 2: pp 13-14.
- 1984        Montana's Noxious Weeds: A Growing Problem. Mike Aderhold. Vol. 15, No. 6: pp 34-37.
- 1985        Arresting Weeds: Ninepipe. Mike Aderhold. vol. 16, No. 2: pp. 15-20.



## Research

The role of natural resource research is to generate ideas, test hypotheses, develop techniques and tools, and to describe relationships among environmental factors, man's activities, and wildlife, fisheries and outdoor recreational activities. It has a responsibility to "crystal-ball" future products and problems, to remain objective in its evaluations, and to recommend solutions to problems.

The MDFWP's wildlife research effort has subscribed to these directions and responsibilities since its initiation in the early 1940's. Research efforts in the fisheries program have been similarly concerned since the 1950's.

Concern has been expressed by some agriculturalists that: 1) wildlife is a major avenue of noxious weed dispersal, 2) that MDFWP managed lands are main sources of noxious weed seeds for nearby private lands, and 3) that invasion of native habitats (eg. forests, rangelands) by noxious weeds will eventually dominate those habitats, rendering them useless for wildlife.

Having identified these concerns, a research proposal, "Noxious Weeds in Big Game Diets" was submitted to the Montana Noxious Weed Advisory Council in 1987 and 1988 for shared funding through the state's Noxious Weed Trust Fund. It proposed to document whether elk, mule deer and white-tailed deer eat spotted and diffuse knapweed in northwestern Montana, and if they do, the relative occurrence or importance in their diets. It also intended to document the viability of knapweed seeds that have passed through digestive tracts and deposited in wintering areas of these big game species. Rejection of the proposal by this Council in early 1987 and 1988 suggests that this is not a serious or statewide concern by agriculturalists. Therefore, the MDFWP does not intend to resubmit this proposal for 1989 consideration.

While the concepts, theories, and principles of plant ecology discount the likelihood of domination of all Montana habitats by knapweed, leafy spurge, or any other agriculturally noxious plants, sportsmen are entitled to know whether desirable native forage and cover plants are being replaced in various locales by non-beneficial species. To this end, the MDFWP's Wildlife Division is monitoring plant composition, status, and trend on those WMAs used as winter range by big game. Those vegetation parameters should also reflect any impacts of applied management practices. Evaluations of this kind are most valuable when conducted at 3-5 year intervals over several decades. Immediately useful information will nonetheless be obtained each time a transect or enclosure is evaluated.

Through its regional biologists and Wildlife Laboratory, the MDFWP

began investigating wildlife food habits in the late 1950's. These studies revealed the importance of many grass, forb, shrub, and tree species in seasonal wildlife diets. They documented consumption of a wide variety of both native and exotic plant species. These food habits have been analyzed and reported in numerous department publications and wildlife graduate student theses from Montana State University and the University of Montana.

In early 1988, the Wildlife Laboratory began transcribing food habits data from index cards to computer files. Once "computerized", the data will be examined for seasonal occurrence of noxious weeds by wildlife species. The data will also be scrutinized for any trends in consumption.

#### Coordinated Weed Control

##### Control

Each FWP region with significant acreages of Wildlife Management Areas (WMAs) or with identified noxious weed problems were allocated additional funds for noxious weed control in FY1987 and FY1988. Expenses for coordinating these activities (Region 8) were also budgeted both years. Misunderstanding of funds available in FY1987 resulted in expenditure of only 12% of those funds (Table 8). Noxious weed control was continued through that year, but expenses were charged to base operational budgets.

Availability of extraordinary funding for control was understood in FY1988, and 65% of the funds were spent (Table 8). Entire budget was spent in FY1989.

Table 8. Summary of Expenditures by the Wildlife Division Under EPP Authorization for FY1987, FY1988, and FY1989

Region	FY 1987		FY 1988		FY 1989	
	Alloc.	Spent	Alloc.	Spent	Alloc.	Spent
1	\$1,000	\$ 0	\$1,000	\$1,285	\$1,000	\$816
2	7,395	2,532	4,995	1,452	4,995	5,127
3	2,000	0	3,250	3,110	3,250	2,811
4	1,600	0	4,000	5,928	7,500	7,519
6	3,000	0	3,000	2,858	3,000	2,832
7	2,400	0	4,400	768	4,400	3,753
8	3,024	0	5,607	1,704	6,274	6,200
<b>Totals</b>	<b>\$20,419</b>	<b>\$2,532</b>	<b>\$26,254</b>	<b>\$17,105</b>	<b>\$30,419</b>	<b>\$29,058</b>

#### Wildlife Management Areas

These comprise the largest category of lands administered by the department. Budgets associated with these extremely valuable wildlife habitats, however, allow basic maintenance like fence repair, road maintenance, removing trespass livestock, signing property boundaries, patrol for enforcing rules and regulations, and some noxious weed control via herbicide application.

Basic management directed toward maintenance and building of soils by improving production of vegetation on the different areas differs with management philosophy. For the most part, properties purchased by the department have required a significant departure from management by private enterprise. For rangelands this has traditionally meant exclusion of grazing by cattle or sheep. The intent is that this release from extraordinary grazing pressure permits recovery by desirable plant species. As they exercise their natural competitive edge, desirable plant species again dominate vegetational communities. It follows that distribution of undesirable species (including agriculturally noxious species) concurrently recedes. By-in-large this management approach has succeeded.

Costs related to managing for this passive advancement of plant succession are minimal (i.e fence maintenance, removing trespass livestock, temporary spraying/mowing noxious weeds). There is heavy reliance on Nature to heal the land. That healing requires

time. Some sites on WMAs have lost so much topsoil prior to MDFWP ownership that they still support only vegetation characteristic of early succession after 40+ years of passive management. Those sites remain vulnerable to invasion by some (not all) noxious plants. Healing of those sites could well require additional decades, or even centuries, for recovery to desired seral stages. These kinds of time frames illustrate why soil and vegetation management are long term commitments, and why consistent, short term treatments tend to be exploitive rather than conscientious land stewardship.

There is increasing support for applying rest-rotation grazing (RR)<sup>3</sup> by livestock to accelerate plant succession. Evidence suggests that this practice accelerates soil building and significantly increases production of/by desirable plants. Rest rotation grazing, in its simplest form, involves only three pastures: one each for early grazing, late grazing and season-long rest (i.e no grazing). Early grazing by an entire herd occurs from about greenup to seed-ripe of the most desirable plant species. The herd is then moved to the second pasture for late grazing, i.e. seed-ripe until normal removal, probably in October. No livestock graze the third pasture that growing season. It is obvious that this system requires a fourth pasture for wintering the herd.

The following year the former rested or ungrazed pasture becomes the early-grazed pasture, the former early-grazed pasture becomes the late-grazed pasture and the former late-grazed pasture becomes the rested pasture. Plant development and requirements, not calendar dates, are the keys to moving livestock from one pasture to the next. And their observance is the key to a successful RR grazing system.

This RR grazing system has documented merit for improving rangelands for livestock, decreasing the distribution of noxious weeds, and it is easier to manage than other "rest" grazing systems. The MDFWP has implemented this system on four WMAs, and is planned for portions of three others (Table 9). We are monitoring the direction and rate of vegetational succession on each of these areas. While the basic concepts of this practice should apply to every site the department manages for wildlife, public trust for proper management of their land demands that evaluation, and modification/termination of the grazing system as needed, is necessary to protect/enhance the resulting habitats for wildlife.

Costs associated with initiating RR grazing involve consultation and design of the system for each area, alteration of interior fences to accommodate the system, and establishing/monitoring vegetation transects in the different pastures. Those monetary costs will be additional to those encountered in passive management. They will be offset somewhat by less need for artificial weed control methods and elimination of problems with

trespass livestock. The livestock used in the rest-rotation grazing system on a WMA usually belongs to a neighboring rancher, who reaps the benefits of grazing on public land. In return, the MDFWP has cooperative agreements with those ranchers to expand the overall management unit by including their private property in the RR system. Any benefits derived by improved habitat for wildlife and livestock, accelerated plant production and succession, and reduced noxious plant problems are shared mutually over an even larger area.

Our department intends to pursue this RR grazing system as a legitimate management tool, unless and until it becomes counterproductive to goals established for each WMA. The WMAs then become combination noxious weed control-applied research-education/demonstration areas for local or regional public and private land managers.

Table 9. Wildlife Management Areas With or Proposed for Rest-Rotation Livestock Grazing Systems in 1988

Wildlife Management Area	Year Acquired	Location/ County	Size (acres)	Acres in RR System
Mount Haggin	1976	Deer Lodge	55,091 Deeded	16,000
Fleecer	1962	Silver Bow	6,411 Deeded 877 Leased	7,000
Wall Creek	1960	Madison	6,149 Deeded 918 Leased	6,200
Isaac Homestead	1989	Treasure	1,202 Deeded	1,200
Blackfoot-Clearwater	1948	Powell/ Missoula	11,496 Deeded 37,965 Leased	11,000 Proposed
Dreyer	1989	Powell/ Missoula	2,960 Deeded 14,622 Leased	2,960 Proposed
Robb-Ledford	1988	Madison/ Beaverhead	17,170 Deeded 17,619 Leased	30,000 Proposed

#### Coordination

Principal activities both years included representing the department as an ex-officio member on the boards of directors of the Montana Weed Control Association and the Montana Department of Agriculture's Noxious Weed Advisory Council. The first group

identifies and prioritizes noxious weed issues on statewide and regional bases, and promotes education and research efforts toward resolving those issues. The second reviews and decides on distribution of funds from the Montana for proposals dealing with weed management and research projects.

Other activities requiring major investments in time include coordinating weed management activities, compiling and reporting those activities each year, and coordinating applications by department personnel for certification/licensing as pesticide applicators. Personnel were so licensed in early 1988. The annual Weed Fair was attended in Kalispell in July 1987, as was a Knapweed Control Research Tour.

Two special presentations were prepared and delivered.

Expenditures for these and some miscellaneous related activities totaled \$5,616 in 1987 and \$3,610 for the first half of 1988. Amounts each year includes wages and benefits of the coordinator.

#### Conservation Reserve Program

The Federal 1985 Food Security Act, or Farm Bill, contained two important provisions that related directly to wildlife. One of these, the Conservation Reserve Program (CRP), provides payments to landowners who plant former cropland into permanent vegetative cover and maintain that cover for 10 years. Professional wildlife biologists who participated in formulating this legislation, were successful in designating the kinds of cover that would benefit wildlife the most.

Because of the growing interest by private landowners in this program, 1.8 million acres of a goal of 3.5 million or more acres were enrolled in this effort by the fall of 1987. Potential benefits to cropland wildlife species, like Hungarian partridge, ring-necked pheasants, white-tailed deer, various ducks and numerous nongame birds, seemed to be underway.

However, concern for the establishment and spread of noxious weeds began in Montana during the summer of 1987. Lest this concern disrupt a growing wildlife benefit program, we have examined the reasons for concern.

First, enrollment in CRP is open to those acres that are purportedly marginal crop lands. That definition indicates eligible lands are those that should not have been cultivated at all. Then the program depends on voluntary contracting by individual landowners; there is no condemnation or application of eminent domain by any governmental agency. Enrollment in the program is only by willing farmers and ranchers.

Second, retirement of the land from cropping is intended to "rest" the land, as well as to reduce crop surpluses and hopefully raise crop prices. The soil is protected from erosion by seeding with desirable grass-legume mixtures. Subsequent increasing annual organic residues, coupled with nitrogen-fixing legumes, should build future nutrient reserves for each enrolled field.

Third, the marginal categorization of enrolled land suggests it is vulnerable to "weed" invasion, and probably contains a reservoir of annual and perennial seeds. Cultivation and seeding of CRP mixtures will encourage germination of some of these seeds, including both innocuous and noxious species. The intended long-term nature of the CRP retirement should result in a "permanent" grass-forb competition compatible with the soil texture and structure. Eventual establishment should discourage successful dominance of the field by either kind of forb. Unless soils have been seriously eroded or disrupted for a long time, native or seeded grasses should dominate vegetation communities within the CRP contract period.

The initial influx of germinating forbs may be disturbing to individuals with a "clean farming" mindset. While the use of broad-spectrum herbicides will kill those plants, many will also kill the beneficial legumes we are trying to establish.

In 1987 there was a complaint of a CRP seed mixture containing Dyer's Woad (Isatis tinctoria) seeds. Their seeding and germinations generated consternation that out-of-state seed sources could also result in introduction of other noxious species. But a new seed law enacted by the 1987 Montana Legislature updated those plant species whose seeds are prohibited from importation in agricultural seeds. The Dyers Woad seeds entered Montana prior to the July 1 effective law date. Similar episodes are not expected in the future if the new seed law is observed and enforced.

Few natural plant communities are monocultures, in Montana or elsewhere. Thus noxious weeds are not going to dominate CRP acreages. Soil and plant succession, as stated previously, is a slow process, and land managers must exhibit the patience necessary to reap the benefits of long term management plans. Early stages of those plans should include periodic monitoring and prescribed treatments for noxious weeds, and allow other plants to continue the healing of these lands. Not only will the soils benefit from CRP, but numbers of desirable wildlife species should increase to the enjoyment of landowners, sportsmen and the general public.

#### DISCUSSION

Expenditures by the MDFWP for noxious weed management were: \$38,701 in FY 1983; \$84,662 in FY1984; \$74,581 in FY1986; \$77,710



in FY1987; and \$72,530 in FY1988. Figures the first 2 years were estimates, and expenditures could not be accounted for during FY1985. Although expenditure coding has facilitated cost accounting since FY1986, not all department employees are required to code their time or expenses to specific activities. Hence all expenditures recorded in these reports are minimal. Secondly, wildlife management area maintenance activities have traditionally included some noxious weed control and expenses for those activities are not identified. Third, fluctuations of expenditures between years of 10% or less are probably not meaningful because of changing personnel and environmental variables.

Neither the total dollars spent nor acres treated for noxious weed control reflect the level of concern by the MDFWP for noxious weed management. Further, they do not reflect any magnitude of noxious weed problems on lands administered by the department. Variables other than those mentioned above that influence the management of noxious species interpretations include:

1. Weather influences the abundance of paucity of any species of noxious as well as desirable vegetation in any given year.
2. Presence or absence of favorable land management practices in the past, which influenced the amount of remaining topsoil, and the quantity and quality of existing vegetation.
3. Status of management practices directed toward achieving individual property goals.
4. Land management practices on adjoining and especially upstream lands.
5. Successful management should ultimately result in a reduction in expenditures and efforts directed at noxious plant species.
6. Varying definitions and perceptions of noxious plant species, i.e. Montana statute permits listing of different species by each of Montana's 56 counties.
7. Amount of use of MDFWP land by the public and trespassing livestock from adjoining properties.
8. Availability (i.e. priority) of funds and personnel time for these efforts from year to year.

There could well be other influencing factors. And each of these factors coincidentally influences other public and private land managers.



It is axiomatic that emergencies do not exist in a noxious plant management program. Plant reproduction and dispersal rates preclude such categorizations. This does not prevent serious noxious plant problems from occurring from area to area, or from year to year on a given area. However, weed management plans/programs should identify contingencies, and outline remedial actions.

Several concerns continue about the noxious weed issue:

- . Interpretation, definition, or categorization of a plant species as a noxious weed is determined primarily by agricultural interests. Although wildlife concerns are acknowledged, they seldom influence final decisions by agriculturally-dominated organizations, which in turn emphasize economic returns to this industry.
- . Agricultural advisors, and preparers of grant proposals for state funds, continue to allude to detriments of agriculturally noxious weeds to wildlife. Such allegations are mostly unsubstantiated by scientific assessments. Moreover, grant proposals by MDFWP for shared funding for projects to test those and related hypothesis to resolve those allegations have been rejected since 1985. Such rejections suggest that unfounded allegations are preferred to answers from credible scientific assessment, and promote further divisiveness among natural resource managers.
- . The role of plants in soil and plant succession, especially as it relates to land management practices throughout Montana, is understood significantly less than it should be in a highly agrarian state. That lack of understanding contributes not only to divisiveness of natural resource interests, but it precludes an effective, unified approach to resolving real or perceived serious plant management problems.

Fishing access sites probably attract more public traffic than other recreational sites managed by the department. They account for the largest identifiable expenditure of funds available for control efforts. They provide the greatest potential for transporting noxious weed seeds because of the amount of public use and because they are used throughout the seed production season.

Parks, monuments, and recreation areas comprise only 10% of all department lands. They also attract large segments of the public seeking a variety of outdoor recreational activities. They are often located for the convenience of the motorized-traveling public, and offer significant potential for transporting noxious weed seeds. However, because they frequently provide facilities for preparing and eating food, as well as prolonged relaxation, the use of herbicides in weed control activities must also consider

their consequences to human health.

The Wildlife Division continues to manage its 49 wildlife management areas (WMAs) to maintain and improve wildlife habitat; they include 280,653 acres and represent 83% of all department lands. While some form of public recreation is permitted throughout the year, most occurs in a short period in the fall. Some noxious weed plants may have already shed their seeds. This natural phenomenon and the widely dispersed public traffic reduced opportunities to transport these seeds away from WMAs.

Management practices, on WMAs aimed at increasing soil and vegetation productivity, contribute to reducing environmental conditions that support noxious weeds. Because many of these lands were used intensely prior to their acquisition by the department, vegetational succession was in various stages of disclimax; some stages were sufficiently primitive to contain disturbed soil surfaces and even soil erosion. Therefore, recovery of much of this land, notably the rangelands, will require time and careful vegetation management. Although some soil stabilization and vegetation recovery can be accomplished within a few years, soil rebuilding may require centuries.

Noxious weeds, that seem to prefer disturbed soil surfaces and immature soils, have invaded and become established on WMAs. Success in controlling them to tolerable levels will also require time. It will also require persistent attention in annual management practices, as well as in long-term management planning.

However, vegetational communities incorporate a variety of grasses, forbs, shrubs and trees naturally; exact community composition is dictated by site, climate and seed stock. The role of each kind of plant, and each species of plant, in wildlife ecology differs. The MDFWP is obligated to provide, to the best of its capability, those plants that support primary wildlife species on each area. Noxious weeds may be detrimental or beneficial to wildlife. Habitat management then requires achieving an appropriate balance of vegetation.

The MDFWP's commitment to responsible LAND STEWARDSHIP is limited only by understanding of our land management goals and available funding. We have practiced some form of integrated pest management, and encouraged its consideration/adoption by other land managers since the 1960's. Our management on WMAs epitomizes that commitment, and should provide demonstration areas for those others managers.

#### RECOMMENDATIONS

This project was assigned in summer 1988 to the Wildlife Division's Habitat Bureau (Stephen J. Knapp, Chief), which is more appropriate than in the Research and Technical Services Bureau. Program

direction for WMA management is one of the primary responsibilities of that first bureau.

The issue of the role of wildlife in disseminating noxious weed seeds (Zoochory) in Montana deserves resolution. Its unresolved status encourages abuse and divisiveness among agricultural, natural resource and wildlife proponents. A first step in addressing this issue could be examining existing big game and game bird food habits data. Matrixing this information by species, by season, location and time period (5 or 10 years) is the recommended approach. The initial step involves transcribing all of that information from index cards onto a computer file; the final step would be publishing the results in Montana Outdoors (popular format) and/or a technical article (scientific format).

Future reports from the noxious weeds coordination project should include more evaluation of individual control efforts. Successes as well as failures need to be examined in order to promote the most effective and economical practices.

We encourage public and private land managers to contact us about demonstration tours of hunters' WMAs, and learn more about the department's LAND STEWARDSHIP Program. Contacts are listed on the back cover of this report.

A common vocabulary and understanding of Montana's natural resources, the natural forces that influence them, and the desired land-use allocations is requisite for the most beneficial management of those resources. Two approaches are suggested at this time:

1. An indepth symposium devoted to soil and plant succession, and their influences on land uses and management practices in Montana. This should be beneficial to a wide variety and large number of current land managers. Federal, state and private managers would be included. Information from this symposium would have immediate application in the noxious weed management issue.
2. A Natural Resource Science program or curriculum within Montana's University System. This would define and fundamentally examine each of Montana's manageable natural resources: soils, minerals, fossil fuel deposits, vegetation, water, fish and wildlife, and air. Corollary unmanageable resources could also be included, like bedrock, landforms and climate. Those basics could then be expanded as special management curricula: cropland management, range science, forestry, fish and wildlife science. This approach would promote common vocabularies and long term understanding that should facilitate identification of legitimate natural resource issues. It should also expedite resolution of

interdisciplinary problems.

Montana is comprised of over 93 million acres of land. Its natural resources are envied by many other states and countries. Envy leads to plans for exploitation: for renewable and non-renewable resources, and for scenery. As Montana enters its second century of statehood, pressures for development will continue to increase, especially from resource-poor areas and entrepreneurs. Montanan's can afford neither duplication of management efforts, nor misidentification of potentially threatening resource issues.

To date the seriousness of the noxious weed issue has been identified as a problem only to agriculture. Until that problem is scrutinized by the non-advocate scientific community, it remains a largely economic and emotional issue that costs landowners and the public millions of dollars each year. Whether cost:benefit ratios are justified in terms of total benefits remains to be assessed by that community. The sooner this multi-disciplinary assessment is conducted, the sooner the problem can be prioritized, and the most effective and appropriately funded efforts can be applied to resolve it.

The department should continue its Noxious Weed Policy for the foreseeable future. However, it should also increase its concern about noxious weed control practices of neighbors adjacent to its properties, and in county weed districts. Sportsmen have legitimate concerns about how these practices might adversely impact wildlife habitats on other public and private lands. Until the various roles of noxious weeds in wildlife diets (nutrition, competitiveness, substitution) are evaluated, the department must exercise caution to prevent unnecessary damage to wildlife habitats on lands it manages. And in the event of less than desirable levels of wildlife on other lands, the department must inquire about land management practices, including noxious or other weed control, on those properties. The existence of wildlife including fish species, depends on plants, and mismanagement of vegetation can have far-reaching impacts on those species that the MDFWP is mandated to protect and perpetuate.

The MDFWP should continue to anticipate identifiable expenditures of \$70,000-90,000 for noxious weed management each year. These amounts will support the current level of management; additional funding will be needed for any program expansion to include new land acquisitions and research.

#### LITERATURE CITED

- <sup>1</sup> Hoar, S.K., A. Blair, F.F. Holmes, C.D. Baysen, R.J. Robel, R. Hoover, and J.F. Fraumeni. 1986. Agricultural herbicide use and

risk of lymphoma and soft-tissue sarcoma. J. Amer. Med. Assoc., 256 (9): 1141-1147.

<sup>2</sup> Colton, T. 1986. Editorial: Herbicide exposure and cancer. J. Amer. Med. Assoc., 256 (9): 1176-1177.

<sup>3</sup> Hormay, A.L. 1970. Principles of rest-rotation grazing and multiple-use land management. USDI Bur. Land Manage. and USDA Forest Service, Training Text 4 (2200). U.S. Govt. Printing Office, Wash. D.C. 26 pp.

APPENDIX A  
WEED CONTROL PROGRAM  
FOR LANDS MANAGED BY THE  
MONTANA DEPARTMENT, FISH, WILDLIFE AND PARKS

Justification

Many plants, both native and introduced species, provide food and/or cover to the more than 400 species of terrestrial wildlife in Montana. Some of those plant species are critical to the survival of certain kinds of wildlife by providing dietary staples or trace elements, birthing and nesting cover, etc., while others are utilized simply because they are available. Plants in general are prerequisite to the existence of wildlife.

Some plant species are undesirable from an agricultural viewpoint. Such plants compete with crop and livestock forage plants for nutrients, water, and space. When successfully established, these weeds can result in economic losses to private land managers.

Problem

The Department of Fish, Wildlife and Parks owns or leases 375 sites located in 34 counties and comprising 324,800 acres (0.3% of Montana's total land area). These areas are set aside for wildlife management purposes, fish hatcheries, state parks and recreation areas, fishing access sites, and administrative sites.

The department has actively pursued a general "good neighbor" policy with regard to agriculturally undesirable plants for many years, and has complied with provisions of the 1979 Montana Weed Control Law. However, there has not been a formal weed control policy in place for department land. To promote understanding of the department's plant management objectives on lands under its control, to further endorse the department's cooperation with agricultural species in minimizing problems with undesirable plant species, and to assure effective application of weed control procedures on department lands, the following program shall be followed.

PROGRAM

Objective

To prevent, to the extent feasible, the reproduction and distribution of agriculturally undesirable plants species on/from department lands to adjacent private lands.

### Evaluation

The feasibility of controlling undesirable plants on department lands shall be determined according to the following factors:

1. Declaration of a plant species as a noxious weed by state law and the appropriate county weed board.
2. Occurrence and density of the noxious weed on department land.
3. Sources of the same noxious weeds on adjacent and/or upstream/upwind lands.
4. Maintaining the welfare of fish and wildlife resources, recreational opportunities, and health and human safety concerns.
5. Funds, equipment and manpower available to the department for noxious weed management.
6. Federal and state restrictions on the methods and materials available for noxious weed management.

### Analysis

To implement this policy, each regional supervisor will systematically analyze all land under the department's control within his region. The analysis for each area will:

1. Identify noxious weeds present.
2. Identify the source of the noxious weeds whenever possible.
3. Identify past and present control methods employed.
4. Map the current location and extent of each noxious weed species.
5. List the number of complaints, if any, concerning noxious weed occurrence on that land.
6. Solicit input from Weed Board or Weed Supervisor.
7. List the objections to noxious weed management on department lands by individuals or groups.
8. Include any other pertinent information.



### Control Plan

Following the analysis, a specific plan will be developed for noxious weed control for each property. The plan will identify the goal as being either eradication or containment of the noxious weeds present.

**Eradication.** Where noxious weeds are in isolated, sparsely occurring groups or clumps, eradication of that plant population may be attempted. Generally, this procedures will be in coordination with similar, intensive eradication attempts by adjacent landowners.

**Containment.** This level of noxious weed control will be practiced when the occurrences of the target plant species is so extensive that eradication is unfeasible.

This plan will include the prescribed control method or combination of methods of controlling the target plant species. Control methods that may be used individually or in combination to attain the adopted goal include:

1. **Mechanical:** Includes cultivation, mowing, hand pulling, cutting or burning.
2. **Chemical:** Herbicides.
3. **Biological:** Includes insects, bacteria, viruses or other plant species. These methods must be approved by qualified weed control scientists.
4. **Grazing:** By domestic animals and wildlife.
5. **Reclamation:** Seeding, nurturing, and protection of those plant species that successfully compete against the undesirable plant species.

The plan will state how the control work will be accomplished. Depending on the situation, acceptable methods include work being accomplished by:

1. Department employees--if necessary, department employees will complete proper training and will receive proper certification and licensing necessary for herbicide application prior to initiating chemical control.
2. Contracting with county weed boards.
3. Contracting with private weed control firms.



4. Cooperative agreements with adjoining or neighboring landowners.

#### Monitoring

All noxious weed control plans will be monitored at least once per year by the regional supervisor or his designee. If monitoring shows the methods chosen for plant control are not effectively meeting the stated goal for an area, the specific plan will be modified and another control method or methods will be added or substituted. If the situation warrants a change in the goal for an area, it can be changed.

#### Communication and Followup

Regional supervisors will meet with each county weed board in his region where the department controls land at least once per year. The supervisor will discuss the department's overall noxious weed control program and will discuss specific weed control plans for the sites under his administration within the county.

The Director will appoint a person as statewide noxious and weed control coordinator. Duties assigned to this person will include:

1. Assisting regional supervisors in developing specific weed control analyses and plans.
2. Disseminating information about the department's noxious weed control to the public and to department employees.
3. Assisting in establishing training schedules and opportunities for department employees regarding noxious weeds and their control.
4. Monitor the overall weed control program of the department.
5. Report noxious weed control activity to the Director at the end of each calendar year. This report will contain a description of all activities undertaken by the department and will contain recommendations for weed control for the coming calendar year.

James W. Flanagan  
Director

Department of Fish, Wildlife and Parks

January 18, 1983  
Date

**Montana Department  
of  
Fish, Wildlife & Parks**



Helena, Montana  
January 26, 1987

Judith K. Gedrose  
State Epidemiologist  
Montana Dept. of Health & Env. Science  
Cogswell Bldg.  
Helena, MT 59620

Dear Judy:

Attached are the two articles referred to during our telephone conversation. A summary of the Hoar et al study was presented by Dr. Robel, one of its authors, at the annual meeting of the Montana Weed Control Association, Jan. 13-15, in Great Falls.

During the question-answer period, Dr. Robel mentioned that the OR's due to herbicide exposure could be reduced up to 60% through the use of protective clothing and gear.

As you and I also discussed, some of our department personnel are involved with mixing and applying herbicides. They use 2, 4-D (a phenoxyacetic acid), dicamba (Banvel, a benzoic), piclionic acid (Tordon, acts like a phenoxy) and glyphosate (Roundup, an amino acid). They use the compounds May-August each year.

We would like your department's view:

- 1) Of the health risks our people face in using these herbicides
- 2) What precautions can they take to reduce or eliminate any health risks (i.e. protective clothing, face masks, or whatever)?

Thanks for your response to this request.

Sincerely,

John Weigand, Ph.D., Chief  
Research & Technical Services Bureau

jcl  
Attachments  
0126.12a

## DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES



TED SCHWINDEN, GOVERNOR

COWLEY BUILDING

STATE OF MONTANA

HELENA, MONTANA 59620

March 5, 1987

 MAR 9 1987  
 DEPT. OF HEALTH

John Weigand, Ph.D., Chief  
 Research and Technical Services Bureau  
 Department of Fish, Wildlife and Parks  
 Helena, MT 59620

Dear John:

After consultation with Doctors Abbott and Quickenden in the Department and Dr. Mary Lund-Mortensen, Centers for Disease Control, I will respond to your January 26, 1987 letter. From the consideration of your questions, I will offer the following responses.

The health risks from exposure to the four (4) products you listed (2,4-D; dicamba; picloric acid and glyphosate) have been studied. Of course the whole field of toxic studies is relatively recent so there is certainly more to learn, especially over time. All four products have potential for acute toxicity if grossly ingested. Potential for long term effects such as carcinogenicity and mutagenicity have been studied but no chronic health problems have been demonstrated as being attributed solely to these products. As is noted in the Hoar et al study, one would not expect cancer as a result of contact with 2,4-D (see page 1145).

Dr. Mortensen was very familiar with the Hoar et al study. She noted the questionnaire was not designed to determine whether or not the person had exposure to one or all of the products. It did not control for exposure to other (possibly carcinogenic products) such as those which contaminated 2,4-D in past years. The study was designed to determine whether or not exposure to herbicides increased the risk of developing soft-tissue sarcoma, Hodgkin's disease or non-Hodgkin's lymphoma. Therefore, conclusions other than that are tenuous.


Manufacturers guidelines should be followed in regards to use of the various products. Your agency should have available a collection of risk data sheets for each chemical being used. These come from the manufacturers at the time of purchase and are entitled, "Material Safety Data Sheet." The Department of Agriculture has provided a Basic Pesticide Training Manual (December 1985) and this may serve as a reference to you also. A text entitled, Pesticides Studied in Man by Wayland J. Hayes was recommended by Dr. Mortensen.

John Weigand, Ph.D., Chief  
March 5, 1987  
Page 2

Persons handling concentrates should be monitored by their supervisors to ensure recommended handling procedures are being followed at all times. To date no practical laboratory monitoring is available for determining whether or not those exposed are being over exposed.

If you have any questions or comments, please contact me.

Sincerely,

  
Judith Gedrose, R.N., M.N.  
State Epidemiologist

JG/war-016b

cc: Ken Quickenden, Ph.D.  
Douglas Abbott, Ph.D.  
Donald Espelin, M.D.

**Montana Department  
of  
Fish, Wildlife & Parks**



Helena, MT 59620  
May 28, 1987

TO: Regional Supervisors

FROM: Ron Marcoux *RM*

RE: PRECAUTIONARY MEASURES FOR EMPLOYEES USING HERBICIDES  
ON DEPARTMENT PROPERTIES

Recent medical research suggests that mixing and/or using some herbicides can increase the risk of contracting some forms of cancer. An opinion issued this spring by the State Epidemiologist from the Department of Health and Environmental Sciences is inconclusive about this relationship.

Until there is agreement among medical authorities on this issue, our department will adopt a position of concern in order to protect our employees.

Any department employee who mixes any herbicides for use on department property, or who applies herbicides for vegetation control on department property, should:

1. read the manufacturers' safety instructions that accompany each container of herbicide;
2. adhere to whatever safety precautions are given in those instructions;
3. utilize safety equipment, including protective clothing, recommended in the instructions.

While herbicides can be an effective method of controlling undesirable vegetation on our lands, their use must be in accordance with recommended safety procedures. The department will provide the safety equipment for protection of our employees who are involved in herbicide application.

John Weigand can be contacted relative to questions about appropriate safety equipment.

Please send a copy of this memo to all personnel in your regions who are involved in the use of herbicides on department lands.

RM/sa

## APPENDIX E

### NOXIOUS WEED MANAGEMENT BY THE MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS<sup>2</sup>

#### (Outline)

Robert Martinka  
Resource Assessment Unit  
and  
John P. Weigand  
Wildlife Division  
Montana Department of Fish, Wildlife and Parks

The purpose of this presentation is to increase awareness about the Montana Department of Fish, Wildlife and Parks' noxious weed management efforts by identifying the kinds of lands it manages, the different objectives for these lands and its LAND STEWARDSHIP program, with a three-pronged approach to undesirable plant control.

#### Background

1. Land acquisition history (the first, the types and locations). Began in 1908 with hatchery site, list beginning with the 1930's; accelerated in late 1940's and 1950's. Types of lands administered: administrative, fish hatcheries, parks, monuments, recreation areas, fishing access sites, and wildlife management areas!
2. Since 1941, WMA acquisition program accelerated with availability of federal aid funds. (Status of acquisition program in 1986 Noxious Weed Management Report, Appendix A, p. 15; and Dedicated to wildlife, 1986, by Mike Aderhold, Montana Outdoor, Vol. 17, No. 6, pp 2-7, 24.)
3. Parks programs (with state parks, monuments, recreation areas) added in 1965.
4. Totals by types and acreage in 1986. Total 470 sites and about 340,000 acres managed by FWP. Majority of acreage in WMAs (280,000 A); then FASs (18,400 A) and state parks (15,300 A) recreation areas (10,700 A).

---

<sup>2</sup> Presented at Symposium on Noxious Weed Biology and Management, Eastern Montana College, Billings, MT, April 3, 1987

## Land Management Objectives

1. Primary products: public recreation and wildlife according to site type
2. Primary responsibility is to the land base = soils plus vegetation. Formal noxious weed policy adopted in 1983.

## Noxious Weed Management Program

Involves three approaches:

1. Direct Control - Management plans outlined for sites and groups of sites.

### METHODS

- a. IPM: biological, mechanical, chemical as prescribed for plant species and site (for immediate control).

In 1986 - 161 sites treated - 2,130 A

- b. for long term control: management by various procedures from total exclusion of livestock to carefully managed rest rotation grazing by cattle.

- c. relate to condition of these properties when they are acquired.

- d. (related to a.) differences in control methods between parks, FASs and WMAs. dictated by size, etc.

2. Education

- a. Demonstration: our properties

- b. Public programs: 2 VCRs, MO articles, local weed meetings

3. Research

- a. none to date

- b. what we should be doing

4. Financing: money spent. Based on past several years, expenditures will run \$50,000 to \$100,000/year.

## CONCLUSIONS

Our efforts are confronted by problems and decisions faced by many landowners:

time and funding  
vagaries of weather

difficult sites and different species

plus we have additional constraints as a government agency

We also have the added dimension of meeting demands of public for recreation and preserving the habitat base on which wildlife depends. No way can we meet public demands for recreation on our lands only! Should be product of our management

weed.rpt



# PRIVATE LAND — RECREATION LAND — IS IT THREATENED?

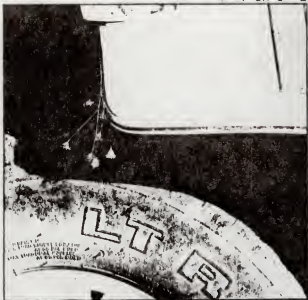
PLEASE TAKE TIME  
TO READ THIS...



WEEDS ARE EASILY TRANSPORTED

Funded in part by: MCBW/C, Inc., Liberty Co. Conservation Dist., and the National Wood Trust Fund.

Photo: David Burch



Check Your vehicles when leaving infested sites.

PLACE  
STAMP  
HERE

## RECREATIONISTS — YOU CAN HELP FIGHT NOXIOUS WEEDS!!!

Spotted knapweed is the most widespread of our rangeland weeds and possibly the biggest threat to our natural resource-based economy. A 1986 survey of Montana counties estimates 4.7 million acres are infested with spotted knapweed. Losses in rangeland productivity may also have an impact on wildlife. Whether you hunt, fish, camp, hike or just picnic on Montana's private and public lands, you might be spreading these undesirable plants to new areas.

Spotted knapweed produces an average of 1000 seeds per plant, but has the capability of producing up to 18,000 seeds on a single plant. Many viable seeds remain inside the seed head after the plant has matured and dried. These mature plants are easily caught on vehicles and transported long distances on all types of vehicles. Recreation and off-road vehicles can be a major means of spread to locations hundreds of miles away.

The photo on the back illustrates how knapweed can be moved from place to place. The photo on the front is a matured and dried plant, called a skeleton, which is easily seen after the snow has covered the ground. The dried stem and flower heads will protrude through the snow.

While hunting, fishing or just enjoying the land, PLEASE be on the lookout for this and ALL NOXIOUS WEEDS. If you think you have seen spotted knapweed, or any of the other noxious weeds, please report them to the landowner or to the local weed district.

On the back of this pamphlet a space has been provided for you to write down the location of the infestation. This will help landowner relations and help keep the land free of NOXIOUS WEEDS.

Ask first to hunt and fish on private land.

*Created by David Burch,  
Liberty County Weed Supervisor*

SPOTTED KNAPWEED IN BLOOM



Photo: Reeves Patrol

YOUR SUPPORT IN THE REPORTING OF NOXIOUS WEEDS IS APPRECIATED. PLEASE COMPLETE AND RETURN THIS CARD.

### NOXIOUS WEED LOCATION REPORTING CARD

(Send to Landowner or Local County Weed District)

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

FOR LANDOWNER REFERENCE

ZIP \_\_\_\_\_

PHONE: \_\_\_\_\_

TYPE OF WEEDS

Sketch Weed Location Below.

LOCATION OF WEEDS

FWP'S ROLE IN NOXIOUS WEED CONTROL

John P. Weigand  
Noxious Weeds Project Coordinator  
Montana Department of Fish, Wildlife and Parks

For purposes of this discussion, noxious weeds are those which are considered undesirable from an agricultural viewpoint. They may or may not be undesirable from a wildlife or environmental viewpoint.

BACKGROUND

FWP's role in noxious weed control is predicated on its legislated mandate to protect and perpetuate Montana's fish and wildlife resources, origin of plant species, documented threat to wildlife or its habitat, and relationship to a broader, ecologically sound LAND STEWARDSHIP program.

Plants native to Montana, or even to North America, are not considered noxious to wildlife. Moreover, some introduced plants (like sweetclover and smooth brome) are valuable food and cover plants, and are not considered noxious. Most allegations of threats to wildlife habitat, by invasion of agriculturally undesirable plants, are perceptions/speculations rather than documented by legitimate assessments.

The products of FWP's LAND STEWARDSHIP program are outdoor recreation (like hunting, fishing, picnicking, etc.) that are generated by preserving soil, water, desirable vegetation and various cultural features. While the individual products of farming, ranching and land management by federal agencies may differ from these recreational activities, they also depend on soil and desirable vegetation.

Leafy spurge, spotted knapweed, diffuse knapweed and Russian knapweed are aggressive, exotic plant species and have not been identified as valuable vegetational components of wildlife habitat. Therefore, the FWP supports concentrated efforts on these targeted species.

A THREE-WAY APPROACH

Given the aforementioned definitions and limitations, FWP's approach to noxious weed control is three-pronged: control or containment, education, and research. Sometimes all three are intertwined in one project.

---

Presented to the Bureau of Land Management Advisory Council annual meeting, April 14, 1988, Miles City, MT.

## Control

First, the department has a Noxious Weed Policy. In it we are committed to trying to control noxious species on our properties, within our budgetary limitations. We also agree to cooperate with our neighbors, private and public, in a unified effort to control specific noxious weeds. To these ends, FWP has entered into cooperative agreements with noxious weed districts throughout the state.

Controlling noxious plants, as you all know, can be quite a challenge. As of July 1, 1986 the FWP managed 432 different sites that totalled 337,792 acres (see Summary Table). With sites varying in size from a few to more than 54,000 acres, and managed to meet one or more objectives, noxious plant control would seem to be an insurmountable task. However, not all 338,000 acres have noxious weeds on them. Each FWP region has developed a Noxious Weed Management Plan for all department properties within its jurisdiction. Although we spent over

Summary of Kinds, Numbers and Sizes of Properties Managed by the Montana Department of Fish, Wildlife and Parks (as of July 1, 1986).

Kind of Property	No.	Total Acreage	Largest (Acres)
Administrative	18	159	82
Fishing Access Sites	235*	19,032	3,169
Fish Hatcheries & Spawning Stations	18	649	90
State Monuments, Parks Recreations Areas	112	31,754	9,703
Wildlife Management Areas	49	286,198	54,137
<b>TOTALS</b>	<b>432</b>	<b>337,792</b>	<b>-----</b>

\*201 FAS are less than 100 acres in size

\$91,000 in control efforts in 1987, and although we still have noxious plants on some acreages, our efforts seem to be moderately successful.

Soil and plant sciences tell us that disturbed soil surfaces are primary sites for noxious weed establishment. Disturbance results from cultivation, road construction, heavy grazing by hoofed animals, vehicle travel, logging, mining and many other causes.

Our state parks, monuments and similar recreational features attract the public (you and me). We and our vehicles generate disturbance of some sort and plant seeds to these sites during high-recreation periods. A similar situation exists with our fishing access sites. On these kinds of sites we mow and apply herbicides, whichever is most appropriate.

The largest sites and total acreage occur as wildlife management areas (WMA). They are managed to produce forage, cover and resting areas for a variety of wildlife. Many are open for public recreation during most of the year; big game winter ranges, however, may be closed from public use to prevent unnecessary stress on the animals. These WMAs provide opportunities to develop long term land management plans, and form the core of our LAND STEWARDSHIP program. Because stewards are defined as those paid to look after another's estate, FWP is correctly the steward of the estate of Montana sportsmen.

Each WMA has a management plan, which is updated periodically to reflect new concerns and/or changes in management objectives. While a basic concern is preserving soil and improving vegetation, different management strategies are applied to different areas. Some WMAs now employ cattle in a carefully regulated rest-rotation grazing system to actually improve habitats for wildlife. Other areas continue to exclude livestock grazing. Both strategies exhibit some degree of successful noxious weed control.

HB 526, enacted by Montana's 1987 legislature and signed by the Governor, authorizes the FWP to acquire and develop additional wildlife habitats via purchase, lease and easement. The bill will generate about \$2.2 million annually for this purpose.

The FWP acquires only those areas offered by willing sellers, lessors or "easers." Pre-acquisition evaluation of each proposed site will include assessments of noxious weed problems, as well as those for desirable vegetation and wildlife bases. One provision of HB 526 is the earmarking of 20% of each year's income for placement in a trust fund. Interest earned from this fund will be available for maintenance of the acquired properties. Maintenance will include noxious weed control. Because basic funding from HB 526 is just beginning, please don't expect miracles from noxious weed control the first few years. Vegetation management requires a long term commitment, and time to achieve desired results.

### Education

The FWP has developed 3 video films for public showing:

Scourge on Spurge, I and II (each covers cooperative efforts in using domestic goats to control leafy spurge; II includes the research results).

Noxious Weeds: A Growing Concern  
(presents overview of the problem and recommends actions that outdoor recreationists can take).

In addition, various conservation education officers and wildlife biologists present talks to various public groups on noxious

weeds.

Management systems on WMAs also serve as valuable education tools by providing demonstration areas for the public.

#### Research

Evaluations of the success of various control procedures on FWP properties are an ongoing process. Long term assessments of change in vegetational communities are being integrated into some WMA management plans. Big game food habits records, accumulated since the 1950's are being reexamined for the occurrence and importance of noxious weed species.

Cooperative funding is being sought to determine whether spotted and diffuse knapweeds are being eaten by elk, mule deer, and white-tailed deer in northwestern Montana. If these plants are being consumed, we would also like to document whether their seeds are viable following passage through digestive tracts of animals.

#### CHARACTERISTICS OF A PROGRESSIVE PROGRAM

Measures that we envision as having the greatest, the most positive, and the longest lasting effects on the overall issue of noxious weed control are: prevention and total land management. Containment, or more popularly termed "control", is viewed as a short-term measure that is needed while working for a successful program encompassing the first two.

#### Prevention

Those exotic plants that are documented as being agriculturally or environmentally undesirable, and not yet occurring in Montana should be discouraged from entering our state. Prohibition of their seeds in any crop seeds imported into Montana is one course of action; this is addressed as of July 1, 1987 by revised state law. Any such plants found in Montana should be eradicated immediately.

A "certified weed-free hay/feed" program is being considered for southwestern Montana. It includes eliminating noxious plants from hay production areas and slowing their introduction into new areas by requiring all public land users with horses to feed their animals weed-free feed.

Another prevention measure would be certified cleaning of all large farm machinery coming into Montana from out-of-state. That measure has raised some concerns, but deserves further exploration.

The current Conservation Reserve Program (CRP), that contracts establishing permanent herbaceous cover on marginal croplands, will ultimately reduce opportunities for establishment of noxious weeds.



### Total Land Management

Each landowner, private or public, with serious noxious weed problems should re-examine their land management practices. Each option that promotes long-term stability and concurrent improved productivity should be considered.

The development of biocontrol methods, or the culture and distribution on diseases, parasites, and other depredating organisms or noxious weeds, is encouraged. However, they represent only one tool, and are only part of the total land management improvement program needed for a successful noxious weed management program.

From a public funding standpoint, a large control effort concentrated on a few noxious plant species would probably be more effective than scattered, smaller efforts on numerous species. To this end, we support emphasis on trying to control leafy spurge and the three knapweeds, and delay major concern over all other species.

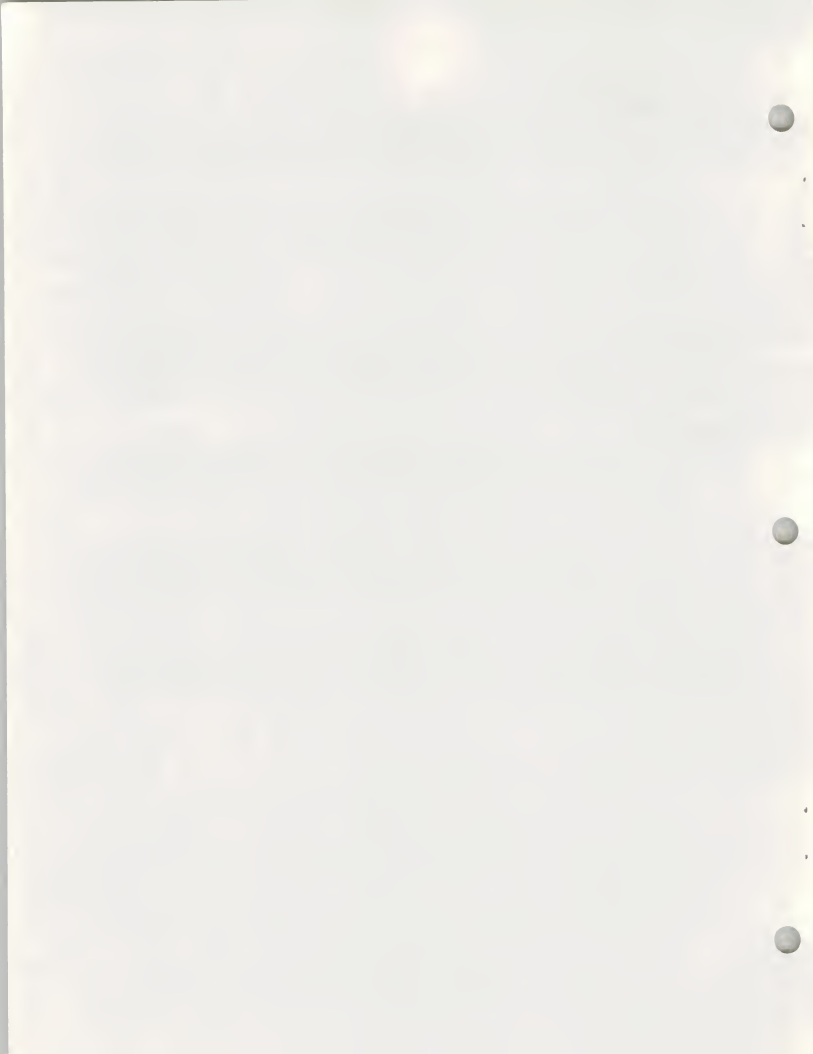
### Conclusion

FWP intends to be a good land steward that promotes conserving our soil. That in turn means managing the vegetation covering that soil with the most desirable plants that the soil texture and structure will support.

Our management to achieve that goal may employ livestock grazing, or exclude it entirely. It may or may not include the use of herbicides. It may require limiting public access to foot travel and use of vehicles only to retrieve harvested big game animals. It may mean stricter enforcement against trespass livestock. It may mean using biocontrols.

In other words, we (like you) want to keep our options for combating noxious weeds open. But we also intend to exercise responsible restraint in promoting a healthier environment for all of us.

412.5





## PROGRAM GOALS

- FISH** To preserve and perpetuate all aquatic species and their ecosystems and to meet the public demand for fish in state waters.
- WILDLIFE** To protect, enhance, and regulate the wise use of these renewable resources for public benefit now and in the future.
- PARKS** To manage Montana's scenic, historic, archaeologic, and recreational resources to meet present and future needs.

## REGIONAL OFFICES AND SUPERVISORS

### REGION 1

Allen A. Elser  
P. O. Box 67  
490 N. Meridian  
Kalispell, MT 59903  
(Tel. 752-5501)

### REGION 2

Jerry D. Wells  
3201 Spurgin Road  
Missoula, MT 59801  
(Tel. 542-5500)

### REGION 3

LeRoy J. Ellig  
1400 South 19th  
Bozeman, MT 59715  
(Tel. 994-4042)

### REGION 4

Dan P. Vincent  
4600 Giant Springs Road  
P. O. Box 6609  
Great Falls, MT 59406  
(Tel. 454-3441)

### REGION 5

Roger R. Fliger  
1125 Lake Elmo Drive  
Billings, MT 59105  
(Tel. 252-4654)

### REGION 6

Arthur D. Warner  
Rural Route 1-4210  
Glasgow, MT 59230  
(Tel. 228-9347)

### REGION 7

Norman W. Peterson  
Rural Route 1, Box 2004  
Miles City, MT 59301  
(Tel. 232-4365)